

METHODS FOR PROCESSING, OPTIMIZATION, CALIBRATION AND DISPLAY
OF MEASURED DIELECTROMETRY SIGNALS USING PROPERTY
ESTIMATION GRIDS

ABSTRACT OF THE DISCLOSURE

- 5 A method is disclosed for processing, optimization, calibration, and display of measured dielectrometry signals. A property estimator is coupled by way of instrumentation to an electrode structure and translates sensed electromagnetic responses into estimates of one or more preselected properties or dimensions of the material, such as dielectric permittivity and ohmic conductivity, layer thickness, or other
- 10 physical properties that affect dielectric properties, or presence of other lossy dielectric or metallic objects. A dielectrometry sensor is disclosed which can be connected in various ways to have different effective penetration depths of electric fields but with all configurations having the same air-gap, fluid gap, or shim lift-off height, thereby greatly improving the performance of the property estimators by decreasing the number of
- 15 unknowns. The sensor geometry consist of a periodic structure with, at any one time, a single sensing element that provides for multiple wavelength within the same sensor footprint.